

## CLAIMS

1. A method for manufacturing a planar optical waveguide, comprising the steps of forming a lower cladding layer on a substrate, depositing an optical waveguide layer on the lower cladding layer, patterning the optical waveguide layer, and depositing an upper cladding layer on the patterned waveguide, wherein the optical waveguide layer comprises an inorganic-organic hybrid matrix uniformly doped with photosensitive photochemical monomers, and is selectively exposed to a beam having a predetermined wavelength region, unexposed monomers are removed, and the patterned layer is cured by thermal heating.

2. The method as set forth in claim 1, wherein the hybrid matrix contains silicon and oxygen atoms, with at least a fraction of the silicon being directly bonded to substituted or unsubstituted hydrocarbon atoms.

3. The method as set forth in claim 2, wherein the hybrid matrix comprises an oxide of the metal selected from the elements of groups 3A, 4A, 3B-5B of the Periodic Table, and combinations thereof.

4. The method as set forth in claim 2, wherein the

hybrid matrix comprises fluorine atoms.

5. The method as set forth in claim 1, wherein the photochemical monomers are selected from the group  
5 consisting of monomers capable of being dimerized upon radiation, and combinations thereof.

6. The method as set forth in claim 1, wherein the photochemical monomers are selected from the group  
10 consisting of monomers capable of chemically bonding to chains constituting the matrix, in the matrix upon radiation.

7. The method as set forth in claim 1, wherein the photochemical monomers are selected from the group  
15 consisting of monomers capable of being polymerized in the matrix upon radiation.

8. The method as set forth in claim 1, wherein the photochemical monomers are selected from the group  
20 consisting of ethyl 2-(1-naphthyl)acrylate, coumarin, acenaphthylene, naphthylmethacrylate, naphthylenethiol, benzoinethers, benzylketals, alpha-dialkoxyacetophenones, alpha-hydroxyalkylphenones, alpha-aminoalkylphenones, acylphosphine oxides, benzophenone/amines, thioxane/amines, and  
25 mixtures thereof.

9. The method as set forth in claim 1, wherein the optical waveguide layer is exposed to a beam through a mask covering the waveguide layer.

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10. The method as set forth in claim 1, wherein the optical waveguide layer is exposed to laser without a mask.